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LIST

OF THE

CONTRIBUTORS.

With References to the several Articles contributed by each.

LIST OF PLATES.

4. On some new Australian Species of Crustacea.

By C. Spence Bate, F.R.S., F.L.S., etc.

(Plates XL. and XLI.)

The following species of Crustacea were collected and sent to the British Museum by Mr. Angas, who obtained them during his sojourn in Australia. *Angasia pavonina* is figured from a coloured drawing taken of the animal, while living, by Mr. Angas; the others are from preserved specimens by the author.

Angasia, White.

Hippolyte *similis, sed rostrum sine carina dorsali, et sine appendice ad mandibulam.*

Like *Hippolyte*, except that the dorsal surface of the carapace is horizontally continuous on the rostrum, and gradually converges laterally to a point, and the mandibles are without any secondary appendage.

This genus was founded by Mr. Adam White, and orally described by him at a Meeting of the Zoological Society, for the purpose of receiving a very pretty species that was brought from Australia by Mr. Angas.

The arrangement in this memoir differs from that of Mr. White in making the form a genus instead of a subgenus. This I do, first, because a subgenus appears to be both an inconvenient and an unnatural arrangement; and second, because whenever there is any structural distinction, however unimportant it may appear to be to our cognizance, yet it is impossible to classify such a species together in a genus with others not possessing the same structure. For quick detection, no doubt variation in form may be more appreciable for observation than an alteration of structure; but it stands to reason that the latter, however small, must be far more important in the economy of the animal's life than the former. It must also be taken into consideration that we seldom find any structural alteration, however small, without perceiving a more or less important variation in the condition of some other part of the same animal.

This genus is closely allied to *Hippolyte*, from which the most palpable distinction exists in the absence of the carinated ridge that traverses the rostrum and the dorsal surface of the carapace, and in the more important feature of the absence of the apparently insignificant appendages attached to the mandible.

Angasia pavonina. (Pl. XL. fig. 1.)

A. *rostro tam longo quam carapax, et antenna inferiore tam longa quam pars dimidia pleontis sui.*

Length $2\frac{1}{2}$ inches.

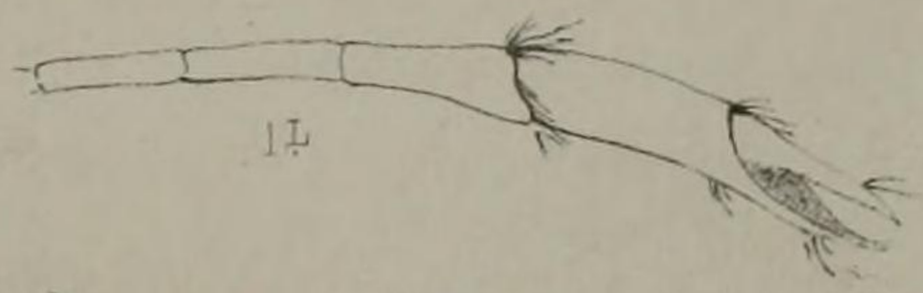
This, the only species that has been found, has the rostrum quite as far projecting in advance of the eye as the carapace extends posteriorly to it, with a deep carina upon the inferior surface, having the margin furnished with four small teeth. The eye is elevated upon a

Fig 1.

1 C.

1d

1k



1L

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1b

2a

2b

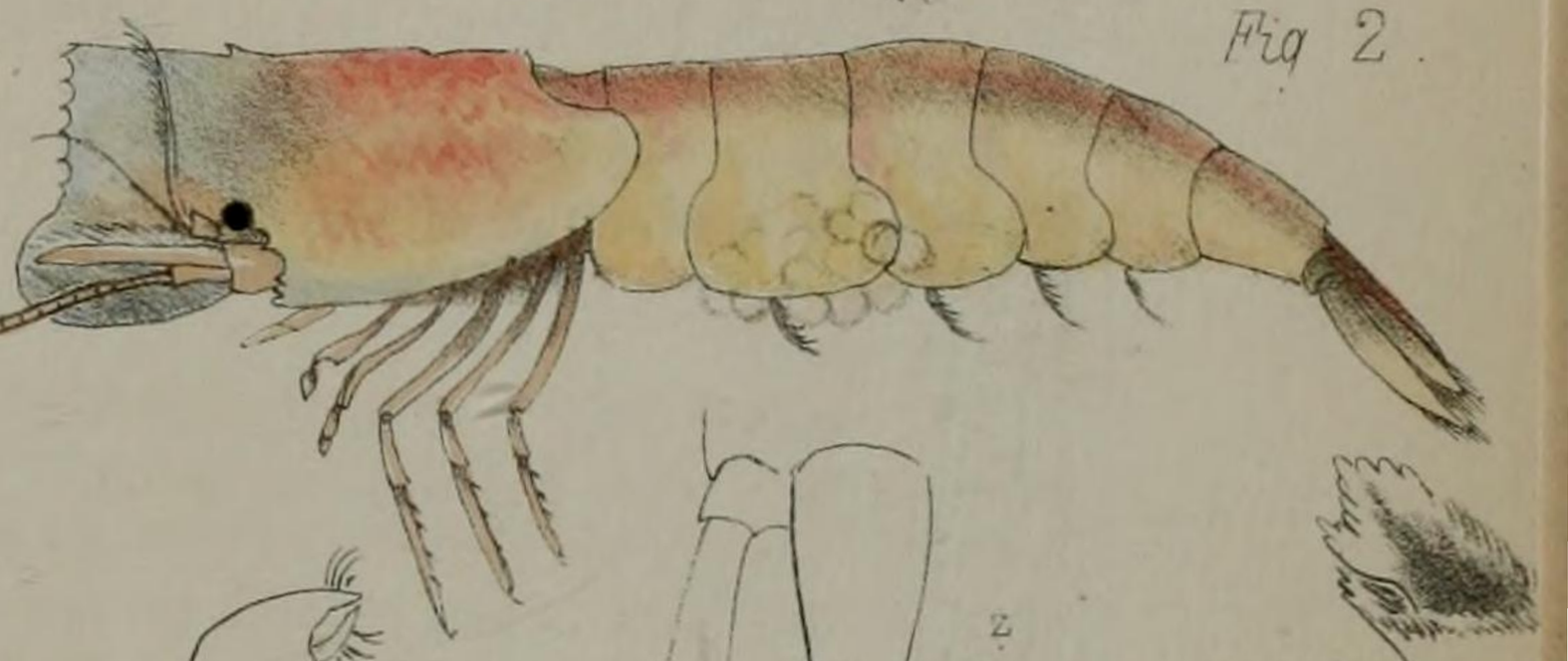
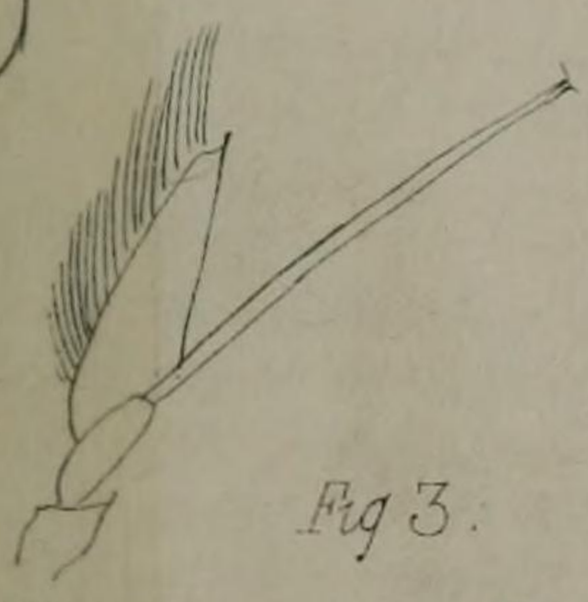
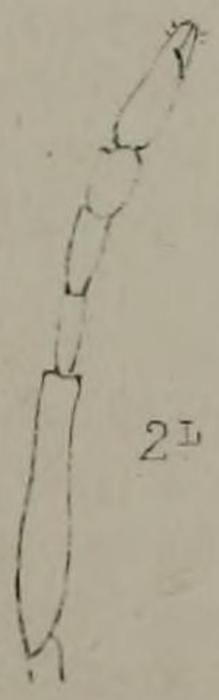


Fig 2.



2c

Fig 3.

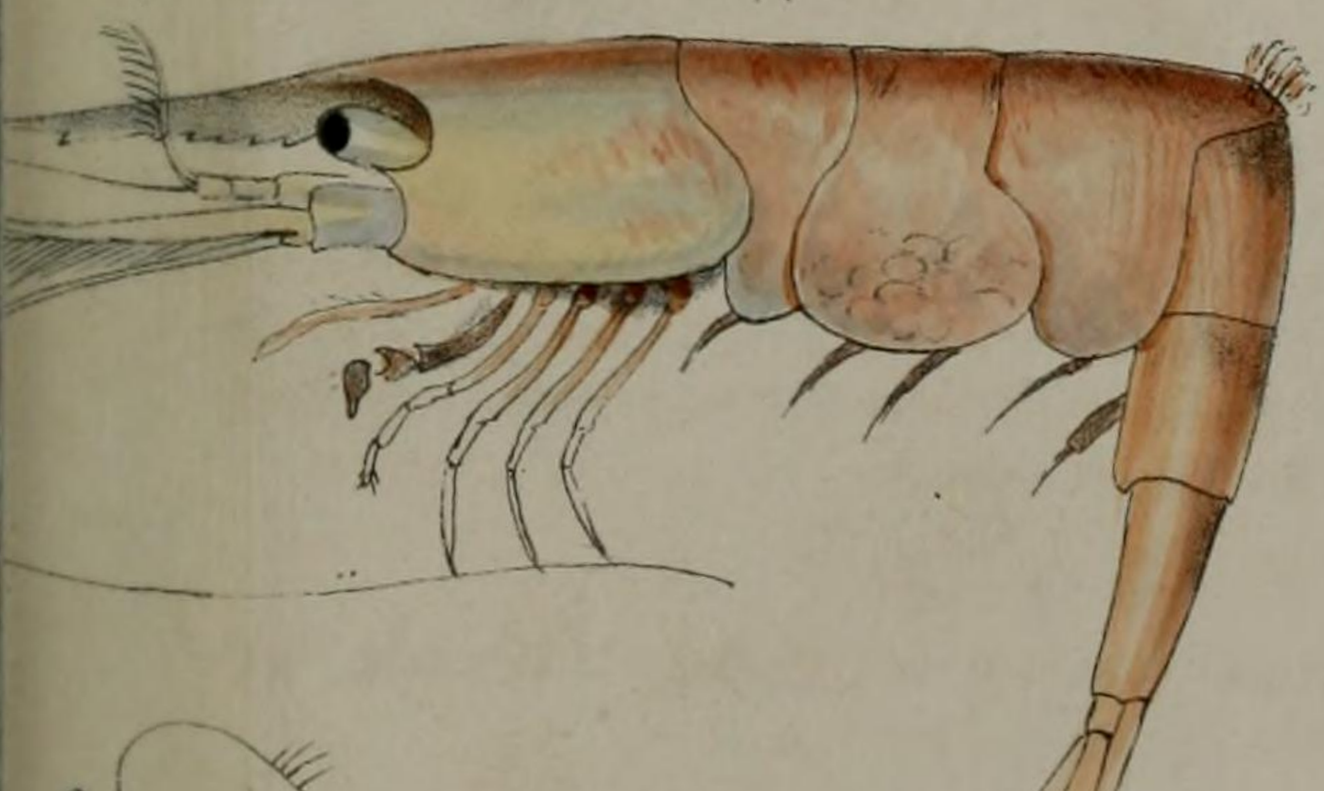


2L

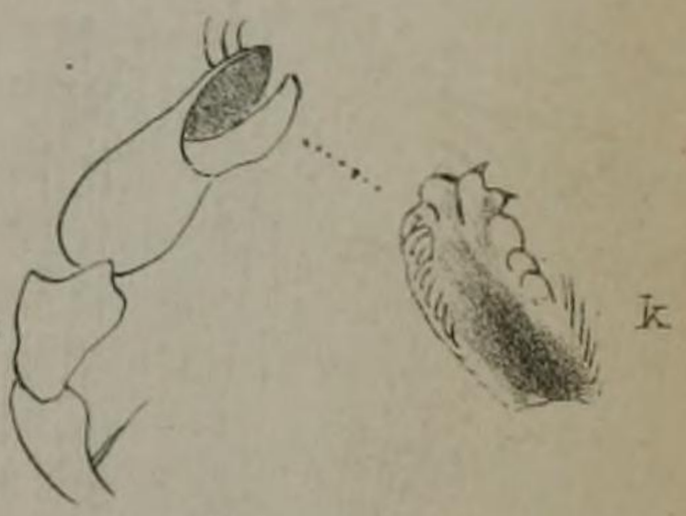
2k

2u

z



4d

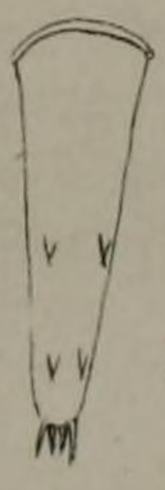


4k

k

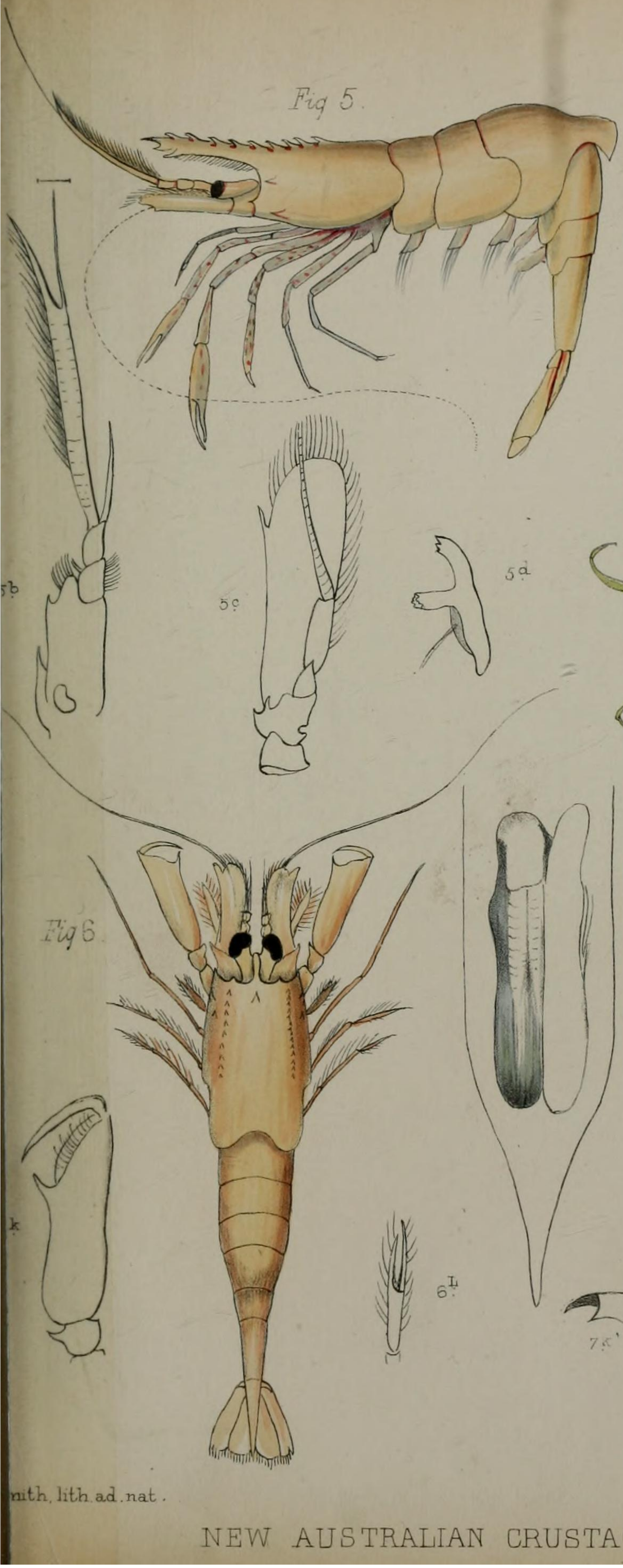
Fig 4.

3L



3z

Fig 5.

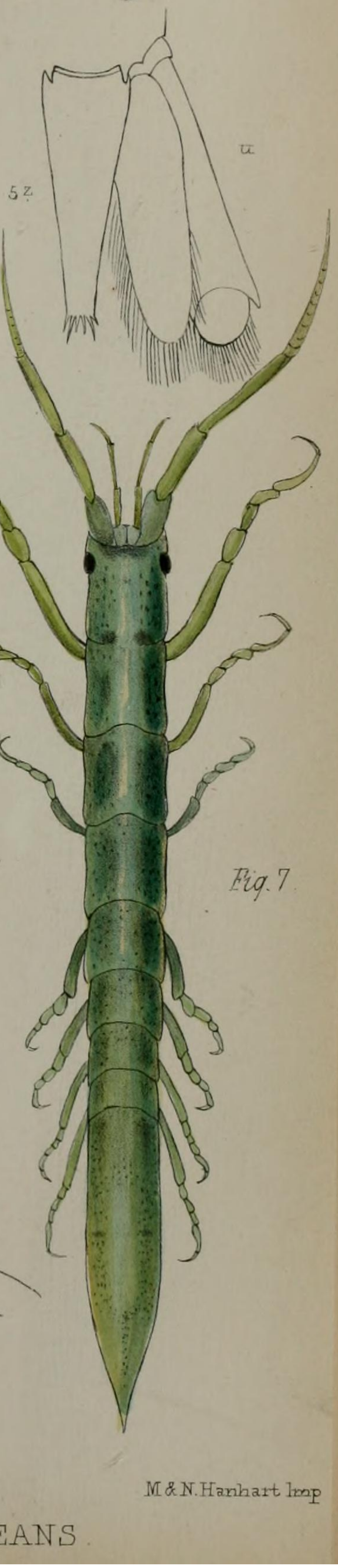


5b

5c

5d

b''



5z

a

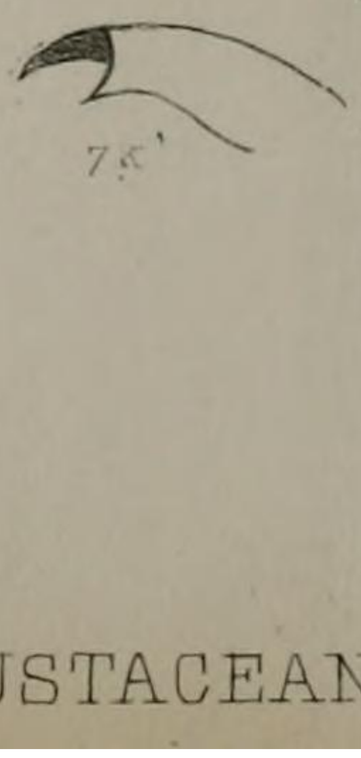
Fig 6.

P

Fig. 7

k

6 1/2



7 1/2

Smith, lith. ad. nat.

M & N. Hanhart Imp

NEW AUSTRALIAN CRUSTACEANS.

long peduncle. The superior antenna is short, the extremity of the flagella reaching scarcely more than half the length of the rostrum, and scarcely longer than the peduncle, the first joint of which is armed with a tooth as long as the joint. The inferior antenna has the squamiform appendage reaching nearly to the extremity of the rostrum, and the flagellum reaching more than the length of the rostrum beyond it. The mandible differs from that of *Hippolyte* in the absence of the small secondary appendages, and in having the molar surface more denticulated and less furnished with hairs. The second pair of gnathopoda are flat or spatuliform, fringed at the apex with eight or nine robust teeth. The first pair of pereiopoda are short, robust, and chelate, having the propodos longer than the carpus. The second pair are long, slender, and chelate, having the propodos shorter than the carpus. The remaining three pairs of pereiopoda are shorter than the second, and slightly more robust, and terminate in simple unguiculate dactyli; the inner surface of the carpi and propodi are armed with spines, those on the carpi being all equally long and strong, while those on the propodi gradually increase in length towards the distal extremity. The pleon has the lateral walls of the first five segments deeply produced, those of the fifth being quite as deep again as the body. The posterior pair of pleopoda are rather longer than the telson, and fringed with cilia, except upon the outer margin of the outer ramus. Telson longer than the last segment of the pleon, terminating in an obtuse point, and armed near the central and terminal margins with two pairs of short spines.

Mr. Angas, who took this very beautifully coloured species, describes it as of a "rich green, between apple and malachite, darker on the back, chrome-yellow and gamboge nose and lines along the back, then cobalt-blue, the rostrum being tipped with crimson. The eye-like spots upon the sides and back rivalled in brilliancy those of the peacock's tail; the centre was filled with intense peacock-blue and green, surrounded by a black ring, then one of crimson-scarlet, the side of each segment being coloured with exquisite purple that shades into a more or less rosy violet, the telson and posterior pair of pleopoda being crimson." Unfortunately it is difficult to retain colour in Crustacea; consequently all this brilliancy of tinting disappeared in about twelve hours. Three specimens of this species were dredged by Mr. Angas in St. Vincent's Gulf, in April 1861, four miles from the shore, on a weedy bottom, in $4\frac{1}{2}$ fathoms of water.

The description is taken from the largest specimen. The other two differ from the type, not only in size, being smaller, but also in the depth of the lateral walls of the fifth segment of the pleon.

Genus Caradina, Edwards.

Division A. *Without second appendage or process to the mandible.*

Caradina truncifrons. (Pl. XL. fig. 2.)

C. *rostro tam alto quam cephalon, margine anteriore truncato et serrato, margine dorsali uno dente instructo.*

Length $\frac{3}{4}$ths of an inch.

Rostrum deeper than the cephalon, the extremity being the deepest part; the anterior margin slightly excavate, and armed with nine small teeth. The rostrum is also furnished with a tooth upon the dorsal surface, immediately above the eyes. The pleon is robust, and but slightly curved. The eyes are small, and planted upon a short peduncle. The superior antennæ reach beyond the extremity of the rostrum. The inferior antennæ are imperfect, but are at least more than one-third the length of the animal; the squamiform appendage is acuminate, subapically tipped with a tooth, and reaches to the extremity of the rostrum. The first pair of gnathopoda are short, spatuliform, the distal extremity being fringed on the inner margin with small but strong spines. The first pair of pereiopoda are much shorter than the second, and by their peculiar formation afford the distinctive character that distinguishes this genus from *Hippolyte*: the propodos is long, ovate, and attached to the inferior process of a hollow or widely crescent-shaped carpus; this is ovate, slightly tapering to the dactylos, which is internally concave, and impinges against a similarly formed process of the propodos. The second pair of pereiopoda are longer than the second gnathopoda, slender and chelate, the propodos being stoutest at the carpal extremity, from which it narrows to the dactylos, which is internally hollow or spoon-shaped, and antagonizes with a similarly shaped process at the extremity of the propodos. The three posterior pairs of pereiopoda are longer and rather more slender than the preceding, are armed upon the posterior margin with five or six equidistant solitary spines, and terminate in an unguiculate dactylos; the posterior pair of pleopoda are about the same length as the telson. Telson terminating obtusely, armed with two strong spines at the apex, and subapically furnished with a short cilium.

The colour of this species when alive was not recorded by Mr. Angas; but since death it has assumed an orange tint, deepening to a red along the line of the primæ viæ.

This description is taken from a female loaded with ova, amongst which were found two specimens of the larva of a Bopyroid Crustacean.

This animal, like the preceding, was captured in about $4\frac{1}{2}$ fathoms of water in St. Vincent's Gulf, on weedy ground, about four miles off the land.

Division B. *Having a fixed denticulated second process on the mandible.*

CARADINA CINCINNULI. (Pl. XL. fig. 3.)

C. *rostri margine dorsali lævi et cincinno parvo supra extremitatem tertii segmenti posteriorem regionis dorsalis. Pleontis antenna superiore quam rostrum longiore, antenna inferiore quam corpus breviore.*

Length $\frac{3}{4}$ths of an inch.

The back of the carapace is smooth, projecting anteriorly into a rostrum that is only carinated below and armed with six teeth. The pleon is likewise smooth; but the third segment is slightly gibbose,

and furnished upon each side of the central line with a small tuft of hair, from which circumstance the specific name is derived. The eyes are large and prominent. The superior antennæ have the primary appendage but half the length of the secondary, The inferior antennæ have the squamiform appendage reaching quite to the extremity of the rostrum, rounded at the apex, and furnished with a sharp tooth one-third from the extremity, and have the flagellum more than half the length of the animal. The mandible is furnished with a short, fixed, small, anteriorly directed process. The first pair of pereiopoda are short, robust, and have the propodos long ovate, narrowing slightly towards the dactylos, and articulating upon the inferior process of the deeply concave anterior margin of the carpus. The second pair of pereiopoda are longer and more slender than the preceding, and have the propodos not larger than the carpus. Posterior pair of pleopoda rather longer than the telson. Telson terminating in two or three small spines.

This species was taken with the preceding, with which it generally agrees in structure, except in the formation of the mandible, which in this specimen has a small anteriorly directed process. This addition, being one of structure, I consider to be sufficiently important to distinguish the present species generically from that of the preceding; but since Milne-Edwards, in his character of the genus *Caradina*, has not described the form of the mandible, it is difficult, until an opportunity offers of examining a specimen of the original species of the genus, to determine which of the two forms of mandible belongs to the type. I have therefore thought it desirable to classify them under Divisions A and B, rather than make a new genus, which must, under the circumstances, be equivocal. Division B approximates in the character of the mandible more nearly to that of the genus *Hippolyte* than Division A.

This description is taken from a female specimen loaded with ova; and if we may judge from the majority of specimens in the small collection being so furnished, we should imagine the month of April, in which they were taken, to be a favourable period for their production.

The colour of this species has not been recorded from the living animal. In its preserved state it is yellowish, blushed with red along the dorsal surface and *primæ viæ*. It was taken, with the previous specimen, in Gulf St. Vincent.

Caradina tenuirostris. (Pl. XL. fig. 4.)

C. *rostro supra dentibus tribus apud basim et infra uno dente apud apicem armato.*

In this species the rostrum is long, slender, and armed with three teeth upon the upper surface near the base, and one upon the under surface near the apex. The pleon is gibbous at the third segment, being slightly produced posteriorly, and dorsally compressed. The eyes are large and prominent, having the peduncle quite half the length of the rostrum. The superior antennæ are one-third longer

than the rostrum, and have the secondary ramus rather shorter than the primary. The inferior antennæ have the squamiform appendage reaching to the extremity of the rostrum, the lateral denticle one-fourth distant from the apex, the flagellum being as long as the animal. The mandibles are furnished with an anteriorly directed or rudimentary incisive process, slightly curved, tapering to the apex, and armed with five small denticles. The first pair of pereiopoda are short, robust, and have the excavation at the anterior margin of the carpus deeply lunate, and the anterior process and dactylos fringed at the margin with several broad and flat teeth and a few hairs. The second pair of pereiopoda are scarcely longer than the first, and are more robust than in the preceding species. The remaining pairs are rather longer than the two preceding, and more slender. The posterior pair of pleopoda are rather longer than the telson, which last differs but little from that of the preceding species.

This description is taken from a female specimen, which is shorter and more robust and gibbous than either of the other species of the genus. The colour of the living animal has not been recorded; but in a preserved state it is yellowish, blushing into red, mostly so upon the dorsal surface and the posterior segments of the pleon.

It was captured, with the other specimens in this collection, by Mr. Angas, in Gulf St. Vincent, under the conditions previously described.

Genus Anchistia, Dana.

Anchistia æsopia. (Pl. XLI. fig. 5.)

A. *rostro supra novem dentibus et duobus infra apud apicem armato. Pleontis tertio segmento in dentem ingentem dorsaliter et posterius producto.*

Having the rostrum nearly straight, armed above with nine teeth, the posterior standing near the centre of the carapace, and with two below near the apex. There is also an infraorbital, as well as a postorbital, and an anterior branchial tooth. The pleon has the third segment postero-dorsally carinated and elevated into a hump-like tooth, being posteriorly produced to a point. The eyes are half as long as the rostrum. The superior antennæ have the peduncle as long as the rostrum; the first joint, being longer than the other two, is broad, squamiformly developed, and armed with two teeth, a large one near the base, and a smaller one near the distal extremity; near the base, in the position of the auditory organ, unlike that of its near ally *Palæmon*, there is a distinct otolithe; the next two joints are short; the flagella are three, the primary and secondary being fused together for about two-thirds the length of the primary, the secondary being half as long again, and the tertiary being only one-third the length of the primary. The inferior pair of antennæ have the squamiform appendage round at the point, furnished with a tooth one-third from the apex, and reaching quite to the extremity of the rostrum—the flagellum being as long as the animal. The mandibles are of the same form as in *Palæmon*. The second pair of gna-

thopoda are pediform. The first pair of pereiopoda are chelate, slender, the propodos being slightly enlarged, and the dactylos straight and nearly as long as the propodos. The second pair of pereiopoda are longer than the first, and also larger; the dactylos is slightly longer than the antagonizing process of the propodos, but not longer than the propodos independently of the dactyloid process. The posterior three pairs of pereiopoda are about the same length as the first, but more slender, and have the propodi armed with a few short spines. The posterior pair of pleopoda are slightly longer than the telson. Telson obtuse at the apex, and furnished with two long and four short spines.

This species has not had the colour observed when alive; but in a preserved condition it is yellowish, mottled with red, especially upon the pereiopoda, antennæ, and rostrum. It was taken, with the preceding species, in Gulf St. Vincent.

In this species there are two remarkable and interesting peculiarities existing in the superior antennæ. The one is, that at the base of each appears an appendage very like a true otolithe. In Dana's figure of *A. ensifrons*, the organ that he has drawn in the same position, I have little doubt, demonstrates the presence of the same. This is so unusual that I know of no other species with such a structure, except it be a Stomapod spoken of by Huxley. This organ bears a near resemblance to that which Van Beneden considers to be an otolithe, and which was found by him in the inner ramus of the posterior pair of pleopoda in some species of Stomapoda. The second peculiarity in the condition of the superior antennæ is the fusion of the primary with the secondary appendage through nearly the entire length of the former—and this not by an absorption of the one into the other, but by an apparent union of the two along their margins. This condition exists occasionally more or less in other genera.

Crangon.

Crangon intermedius. (Pl. XLI. fig. 6.)

C. *tres dentes supra regionem branchialem anteriorem et ordinem parvulorum dentium post externum dentem orbitæ habens.*

Having the carapace armed with three teeth on the antero-branchial surface on each side, and a row of minute denticles extending from the extraorbital tooth posteriorly between the cardiac and branchial regions. The rostrum is nearly as long as the eye. The superior antennæ are three times as long as the eye, having the rami subequal and as long as the peduncle. The inferior antennæ have the squamiform appendage reaching nearly to the extremity of the superior antennæ. The first pair of pereiopoda are subchelate, strong, having the palm oblique, marginate, and armed with alternating long and short hairs. The second pair of pereiopoda are chelate, slender, and do not reach beyond the carpus of the first. The third pair of pereiopoda are slender and longer than the first; the remaining two pairs are shorter, being but a little longer than the second. The pleon is short, being scarcely longer than the carapace, and suddenly narrow-

ing at the fifth segment. The posterior pair of pleopoda are not longer than the telson, which is narrow and tipped with two long hairs.

This species was taken at the same time and place as the preceding.

The following species is sufficiently distinct in its organization from *Idotia* to induce the construction of a separate genus for its reception.

Crabyzos, nov. gen.*

Cephalon et pereion æque angusta, segmento primo pereii cum cephalo conjuncto. Antennæ superiores non longiores quam cephalon. Antennæ inferiores admodum longiores quam superiores. Pereiopoda simplicia, dactylis in duos dentes terminantibus; omnia pereiopoda post primum par tenuia et brevia.

The animal is long and slender, the pereion not being broader than the cephalon. The first joint of the pereion is fused with the cephalon; the superior antennæ are not longer than the cephalon; the inferior are much longer than the superior. The first pair of pereiopoda are tolerably robust and long, the rest are short and feeble, and all terminate in a double-toothed apex to the dactylos. The pleon is slightly narrower than the pereion, and has all the somites formed into a single joint; the pleopoda are protected by opercula.

Crabyzos longicaudatus. (Pl. XLI. fig. 7.)

Pleon in cuspidem longam terminans, segmento primo et cephalo æquis; antennæ superiores breviores quam cephalon; antennæ inferiores tam longæ quam pereii segmentum secundum.

The cephalon and first joint of the pereion are of equal length; the others gradually decrease in length posteriorly; the dorsal surfaces are nearly flat, while the margins with the coxæ stand nearly perpendicular to them. The pleon gradually narrows posteriorly, where it terminates in a long cusp or point. The eyes are round and prominent, and placed near the latero-anterior margins. The superior antennæ are shorter than the cephalon. The inferior antennæ are about four times as long as the superior, and reach to the extremity of the second somite of the pereion. The first pair of pereiopoda are tolerably robust and long; all the others are shorter and more feeble; all terminate in double-pointed dactyli, which form with the propodi prehensile organs. The pleopoda are enclosed within two laterally attached opercula.

The animal is described as being of an apple-green colour, darker along the line of the primæ viæ, and covered with numerous minute spots over the surface generally.

Three specimens were taken, one of which is $1\frac{1}{2}$ inch long, the other two being scarcely more than 1 inch—a circumstance probably dependent upon sexual distinction.

These were taken at the same time with those previously described.

* Deriv. κράβυζος, a little shellfish.

EXPLANATION OF PLATES XL. & XLI.

Fig. 1. *Angasia pavonina* (White).
C. Rostrum.
P. Pleon.
b. Superior antennæ.
b''. Otolithe of ditto.
c. Inferior antennæ.

Fig. 1. *d*. Mandible.
k. First pair of pereiopoda.
k'. Dactylos of ditto.
l. Second pair of pereiopoda.
u. Posterior pair of pleopoda.
z. Telson.

N.B. These letters refer homologically to each animal alike.

Fig. 2. *Caradina truncifrons*.
Fig. 3. —— *cincinnuli*.
Fig. 4. —— *tenuirostris*.

Fig. 5. *Anchistia æsopia*.
Fig. 6. *Crangon intermedius*.
Fig. 7. *Crabyzos longicaudatus*.

5. Description of a New Species of Flexible Coral belonging to the Genus Juncella, obtained at Madeira. By James Yate Johnson, Corr. Mem. Z.S.

Fam. Gorgonidæ.

Sect. Gorgonellaceæ, Val.

Juncella flagellum, sp. nov.

Simple, elongated, slender, flexible, slightly twisted on its own axis, and tapering upwards. Bark calcareous, white, smooth, and impuncturate, enveloping a hard grey axis, which has a somewhat polished surface marked with straight striæ. This axis is so highly charged with carbonate of lime that it effervesces in muriatic acid. The coral is quadrangular in section, and has on each of the two narrower sides two series of closely set papillæ, having the eight lobed orifices of polype-cells at their apices. These papillæ are ob-pyriform or ovate; and in dried specimens they are turned upwards and adpressed to the stem. Near the base of large specimens the papillæ are in three somewhat irregular rows. The other two sides of the stem are free from papillæ, but there is a slightly elevated line along the middle. The base spreads out to a moderate extent upon the object to which it is attached. The spicula, of which the bark is composed, are tuberculated staves two or three times as long as broad, the tubercles having a tendency to collect at the extremities.

The longest example of this coral which I have seen, measured about 7 feet in length; and it was without its basal portion. The greatest thickness was three eighths of an inch; the largest papillæ were the tenth of an inch in length, and about the same across. In another example, 5 feet in length, the base spread out to the size of a shilling; and the papillæ commenced about 3 inches above this basal expansion. The smallest specimen that has occurred was 31 inches long; and this has been sent to the British Museum. In the collection of that establishment there is a large stone with numerous specimens of this coral upon it, alongside examples of *Callogorgia verticillaris*, Gray (*Primnoa verticillaris*, M.-Edw.). These were brought from St. Michael's, one of the Azores, and presented to the Museum by Mr. McAndrew.

I have ventured to assign this coral to the genus *Juncella*, Val.,